SUMMARY AND CONCLUSION
The uncontrolled proliferation of cells, by which cancer tissue differs from normal tissue, is accompanied by marked metabolic differences. The process of de-differentiation as well as genetic transmission of neoplastic character creates interest to define the molecular lesion triggering the characteristic phenotype.

The functional phenotype of the cell—the enzymes are known to play fundamental role in every molecular event in the metabolic reactions in cells. Every step in the metabolic pathway is catalysed by enzyme and attempts are being made to explore different enzyme action in growth differentiation, dedifferentiation and progression of malignancy.

An enzyme system involves an enzyme protein, one or more substrate/s, activator and co-factor. The availability of substrate or co-factor together with the amount of activity of the protein enzyme determine the overall rate of complex enzyme system.

The hormonal regulation of enzyme activity has been elucidated and different mechanisms have been suggested by which a hormone might influence the enzyme action.

Uterine cervix is an endocrine target organ and its
epithelium characterize different stages of growth and differentiation. The malignant lesion of cervix, which is one of the commonest forms of cancer found in India, offers a good subject for investigation. The study of macro-molecules in the biological expression of malignancy and the influence of sex hormonal level over its target organ, is possible from the specimen of carcinoma cervix uteri. (The availability of normal uterine cervix helps in the direct comparative study.)

In the present context, normal and cancer cervix have been compared under different hormonal status (pre- and post-menopausal condition). The sex hormonal influence over enzymatic activities in different target and non-target organs, and on cancer cells have been further scrutinized by an experimental design. Sarcoma 180 and Ehrlich's carcinoma, transplanted in oophorectomised and non-oophorectomised Swiss mice, were subjected to exogenous sex hormonal stress and enzyme activities analysed.

In the present context, hydrolytic enzymes - the alkaline and the acid phosphatases, have been investigated in normal and malignant conditions. Alkaline phosphatase is an important enzyme participating in diverse biological functions and its scrutiny in malignant
condition assume significance in the light of irreversible growth potential, characterizing malignancy. Acid phosphatase is known to be influenced by sex hormones and both these enzymes are known to have variants which undergo fluctuation in different physiopathological conditions. The alkaline and acid phosphatase activities were evaluated with respect to their affinities towards a variety of substrates and same substrate with intramolecular variation.

Those two enzymes in cervix tissue demarcated normalcy and malignancy, as well as the different physiological conditions by their overall activities and by hydrolysis of different substrates. Alkaline phosphatase of pre-menopausal normal cervix had least affinity towards Na-\(\alpha\)-glycerophosphate among the substrates used, while the same enzyme under malignant condition showed highest affinity for the same Na-\(\alpha\)-glycerophosphate.

It was further evident that glycerophosphate of \(\alpha\)-and \(\beta\)-configuration were inversely utilized by alkaline phosphatase in normal and malignant cases of pre-menopausal cervix; the normal cervix displaying greater affinity towards Na-\(\beta\)-glycerophosphate and malignant cervix
having a strikingly high affinity towards Na-α-glycero-phosphate. But this relation did not exist in post-menopausal condition.

Acid phosphatase activity in the cervix tissue displayed a higher preference for the substrate β-naphthyl phosphate in all the conditions studied—whether normal or malignant and whether in pre- or post-menopausal conditions. The activity of the same enzyme was however, strikingly high in case of malignant cervix and almost showed a diagnostic significance for the cancer of the cervix.

Utilisation of naphthyl phosphate of α- and β-configuration by alkaline phosphatase of cervix tissue also demarcated pre- and post-menopausal conditions, irrespective of normalcy and malignancy. Alkaline phosphatase had lower preference for Na-α-naphthyl phosphate both in normal and malignant cases of pre-menopausal condition compared to β-naphthyl phosphate. Contrary to this, the same enzyme of post-menopausal cervix showed higher preference towards the substrate Na-α-naphthyl phosphate.

Utilisation of Na-α- and β-glycero-phosphate and Na-α-naphthyl phosphate by acid phosphatase demarcated pre- and post-menopausal status of the tissue. Utilization
of these three substrates in malignant condition were less than normal during pre-menopause. Reverse utilization of the substrates in malignancy and normalcy were shown in case of post-menopause.

(In oophorectomized control, alkaline phosphatase activity of uterus was greater than non-oophorectomized control) with respect to all the substrates except Na-β-glycerophosphate. Administration of estrogen increased the enzyme activity further, but progesterone decreased the same. Transplantation of tumour cells had certain influence on the target organ which modifies this enzyme activity with respect to hormonal milieu and different substrate utilization. On the contrary, acid phosphatase activity of the uterus remained more or less unaltered inspite of transplantation of tumour cells either in oophorectomized mice or after exogenous hormonal stress.

It was evident from the present investigation that transplanted tumour cells (Ehrlich's carcinoma and sarcoma 180) although not the endocrine targets, were influenced by the ovarian hormones and was characterized by
differential substrate affinities with respect to the activities of alkaline and acid phosphatase. But most of the non-target organs behaved quite differently from that of the target organ, with respect to sex hormonal response. Withdrawal of the endogenous hormones by oophorectomy increased the activity of alkaline and acid phosphatase in most of the organs in normal condition. Unlike that of uterus, estrogen decreased the alkaline phosphatase activity in these organs of normal mice with respect to all the substrates used, but it increased the activity of acid phosphatase. Hence, in most of the non-endocrine target organs estrogen influenced the activities of alkaline and acid phosphatase inversely. Progesterone had variable effects upon both of these enzymes.

With respect to alkaline phosphatase activity, transplantation of tumour cells caused reduction of the enzyme activity in most of the host organs except lung and brain tissue. Contrary to this, acid phosphatase activities in these transplanted host organs displayed a peculiar reaction. Instead of two higher peaks of substrate affinity for Na-β-naphthyl and phenyl phosphate in organs of the normal mice, the organs of tumour bearing host showed a single peak either for Na-β-naphthyl phosphate or phenyl phosphate, according to the type of tumour
transplanted as well as to the hormone administered. This phenomena of altered and reduced utilization of substrates by acid and alkaline phosphatases respectively, seem to characterize the differential influence exerted by the transplanted tumour cells, on the metabolic patterns of these two hydrolytic enzymes in different host organs.

(I appears from the present context that enzymatic patterns in the different conditions reveal adaptation of the enzymes under the influence of hormones as well as under the process of neoplasia.) In order to seek an understanding of the malignancy or particular hormonal condition it is of importance to trace out any macromolecule with respect to its heterogeneity and participation of the individual forms under the above mentioned conditions. (In the present experiment alkaline and acid phosphatases have been scrutinized and characterized under different hormonal conditions and in neoplasia. The differential result obtained under different physiopathological condition with respect to its affinity towards different substrates throw some light with respect to its different molecular forms participating under specific
conditions.) It has been further suggested that tracing an enzyme by disturbing the catalytic sites with a series of micro- and meso-molecules, may serve as a marker in the diagnosis of the various physiopathological condition and may define malignancy at the level of enzymes.